Thanks to the board for allowing this presentation today. I appreciate the opportunity to speak with folks. Thanks also to Jeff Scheirer, WDNR for being on hand to help answer questions and for sharing the his 2017 presentation with me. Saved me some time. Folks that were at the meeting in 2017 may recognize some of the slides.

Overview

- Why are we talking about fish passage now?
- Historical perspective – brief review
- Connecting the SFFR and Pike Chain – why is it important?
- Fish passageway Conceptual Design Specifics
- Questions

One correction to the mailing. Water level in the river is not being raised by 1 foot. Water level in the 2 raceways of the logging dam will be raised a foot but downstream overall river water level will not change.

PIKE LAKE CHAIN LAKES ASSOCIATION
P.O.BOX 106
PARK FALLS, WI 54552

June 7, 2016

Jeff Scheirer, WDNR Fisheries Biologist
875 S. 4th Ave.
Park Falls, WI. 54552

Sue Reinecke, Chequamegon-Nicolet National Forest Service
1170 4th Ave. South
Park Falls, WI. 54552

Dear Jeff and Sue,

Please be advised that our proposed idea of building a fish passage structure at the Round Lake Dam, which has been discussed with you by Steve Ave'Lallemant, was presented at our Pike Lake Association Annual Meeting on Saturday, June 4, 2016. We also discussed Steve's information on your thoughts for the project and without reservation, the membership present unanimously voted in favor of proceeding ahead with you as partners and begin the process of permitting and proceeding ahead with this structure. There was strong support for this idea and the membership desired to begin this process as soon as possible. I would like your assistance and advice on the process and procedures necessary to advance this project so I can keep the Board and membership advised. Thank you for your support and assistance.

Sincerely Yours,

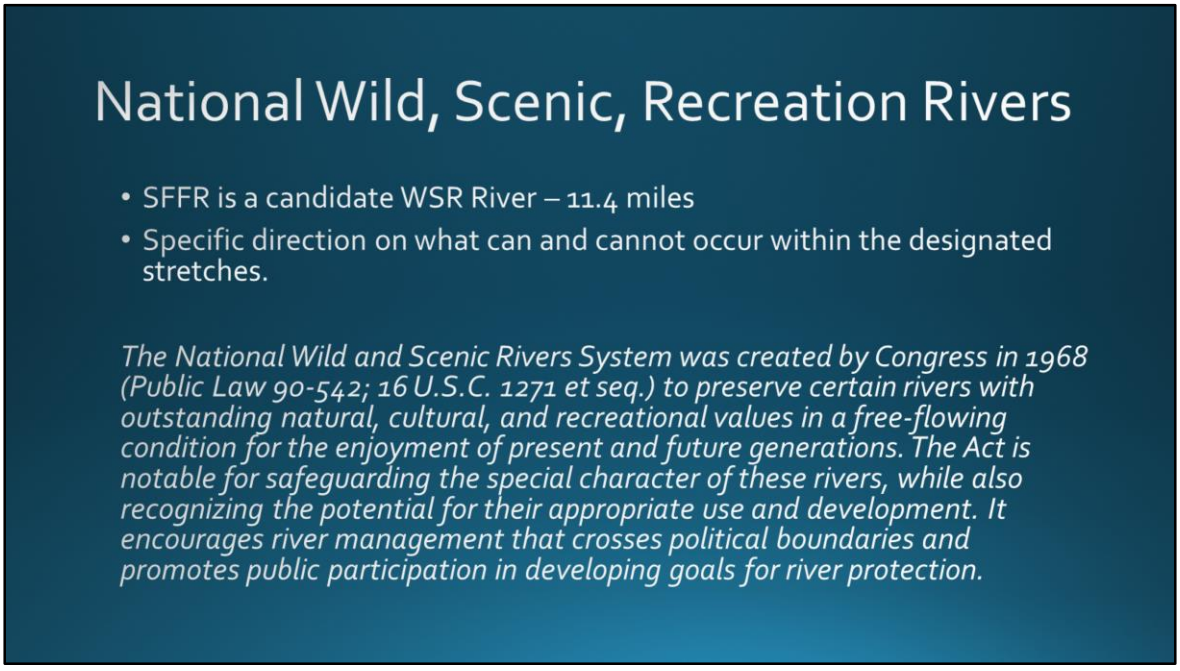
Richard Mace. President, Pike Lake Chain Lakes Association (PLCLA)

Cc: PLCLA Board members

CNNF Forest Plan Direction

- The Plan establishes direction to conserve habitat capable of supporting viable populations of existing native and desired non-native species.
- Provide ecologically healthy streams, riparian areas, lakes and wetlands.
- Conserve or restore populations of endangered, threatened and sensitive species. Lake Sturgeon is classified as a sensitive species.
- Design, construct and maintain stream crossings and dams to minimize disrupting the migration or movement of fish and other aquatic life.

The Forest Plan provides direction for how natural resources are managed within the CNNF.



The SFFR is a candidate National Wild, Scenic Recreation River. Designation begins at the footbridge and continues to the Forest Boundary. Mix of Wild, Recreation and Scenic stretches.

Pike Lake Chain Fishery Management Plan (2015)

- …a restoration strategy aimed at reconnecting the lake and river ecosystems should mimic natural conditions, restore the historic distribution of native fish and freshwater mussel populations, and promote balanced predator-prey interactions.

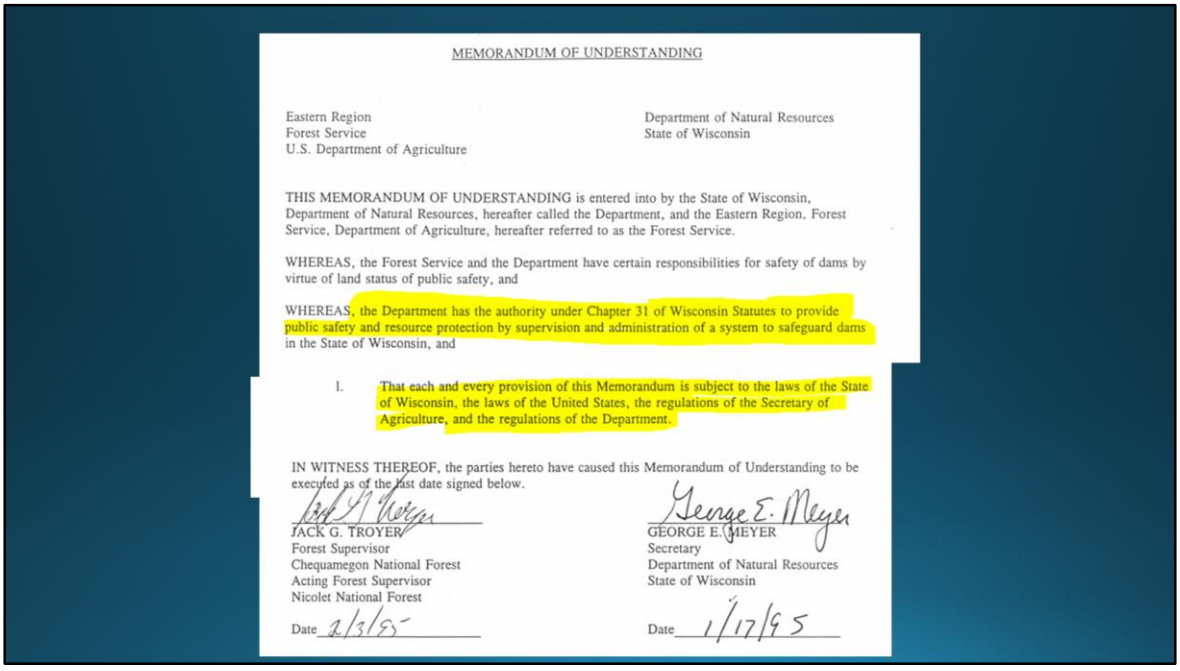
GOAL 9: **BIODIVERSITY:** A diverse native fish community that fluctuates in species composition but generally experiences no net loss of native fish species and provides adequate forage for sport fish populations.

Objective 9.1: No net loss of native fish or other native aquatic species in the lakes or their connecting channels; and no catastrophic losses to disease or poor water quality that could lead to fish community imbalance and failure to achieve important sport fishing objectives.

Objective 9.2: Adequate forage, as reflected by satisfactory growth rates and condition factors of sport fish populations managed under Goals 1-8.

General Ecosystem Management Strategies (Local DNR Recommendations):

Forest Service is not the only agency or group that has direction on managing the area. With the letter from the Lake Association the agencies felt is was a good time to start the conversation about constructing a fish passageway.



MEMORANDUM OF UNDERSTANDING

Eastern Region
Forest Service
U.S. Department of Agriculture

Department of Natural Resources
State of Wisconsin

THIS MEMORANDUM OF UNDERSTANDING is entered into by the State of Wisconsin, Department of Natural Resources, hereafter called the Department, and the Eastern Region, Forest Service, Department of Agriculture, hereafter referred to as the Forest Service.

WHEREAS, the Forest Service and the Department have certain responsibilities for safety of dams by virtue of land status of public safety, and

WHEREAS, the Department has the authority under Chapter 31 of Wisconsin Statutes to provide public safety and resource protection by supervision and administration of a system to safeguard dams in the State of Wisconsin, and

1. That each and every provision of this Memorandum is subject to the laws of the State of Wisconsin, the laws of the United States, the regulations of the Secretary of Agriculture, and the regulations of the Department.

IN WITNESS THEREOF, the parties hereto have caused this Memorandum of Understanding to be executed as of the last date signed below.

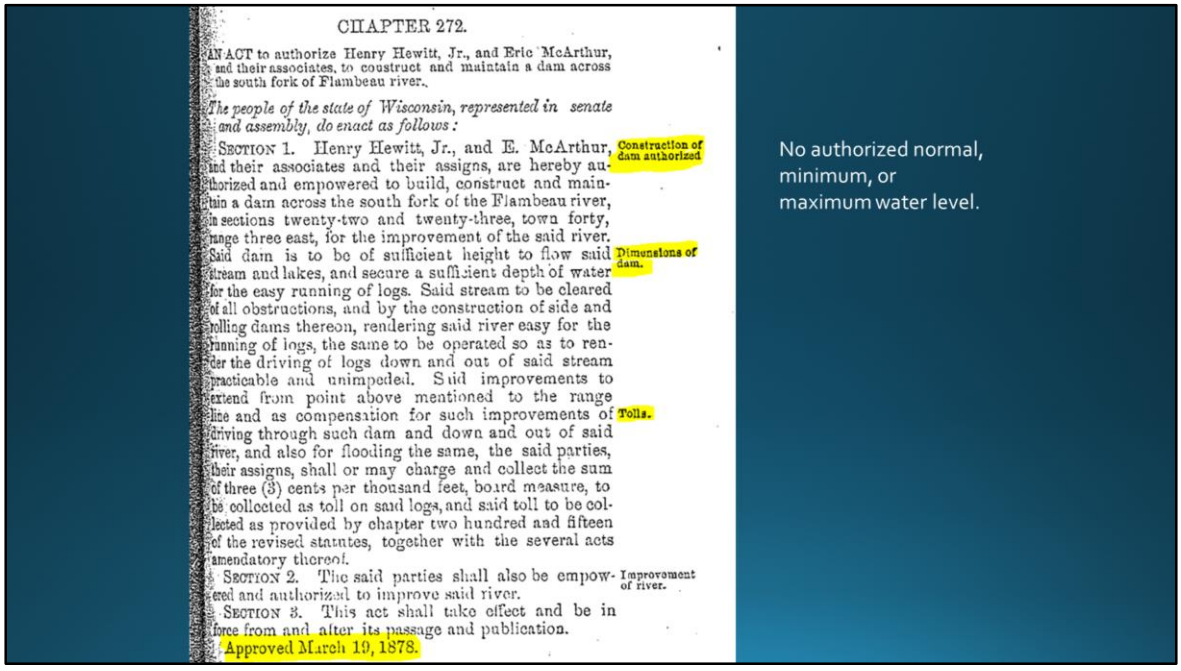
JACK G. TROYER
Forest Supervisor
Chequamegon National Forest
Acting Forest Supervisor
Nicolet National Forest

Date 2/3/95

George E. Meyer
GEORGE E. MEYER
Secretary
Department of Natural Resources
State of Wisconsin

Date 1/17/95

MOU between FS and WDNR regarding dams.



CHAPTER 272.

AN ACT to authorize Henry Hewitt, Jr., and Eric McArthur, and their associates, to construct and maintain a dam across the south fork of Flambeau river.

The people of the state of Wisconsin, represented in senate and assembly, do enact as follows:

Construction of dam authorized

SECTION 1. Henry Hewitt, Jr., and E. McArthur, and their associates and their assigns, are hereby authorized and empowered to build, construct and maintain a dam across the south fork of the Flambeau river, in sections twenty-two and twenty-three, town forty, range three east, for the improvement of the said river.

Dimensions of dam.

Said dam is to be of sufficient height to flow said stream and lakes, and secure a sufficient depth of water for the easy running of logs. Said stream to be cleared of all obstructions, and by the construction of side and rolling dams thereon, rendering said river easy for the running of logs, the same to be operated so as to render the driving of logs down and out of said stream practicable and unimpeded. Said improvements to extend from point above mentioned to the range line and as compensation for such improvements of

Tolls.

driving through such dam and down and out of said river, and also for flooding the same, the said parties, their assigns, shall or may charge and collect the sum of three (3) cents per thousand feet, board measure, to be collected as toll on said logs, and said toll to be collected as provided by chapter two hundred and fifteen of the revised statutes, together with the several acts amendatory thereof.

Improvement of river.

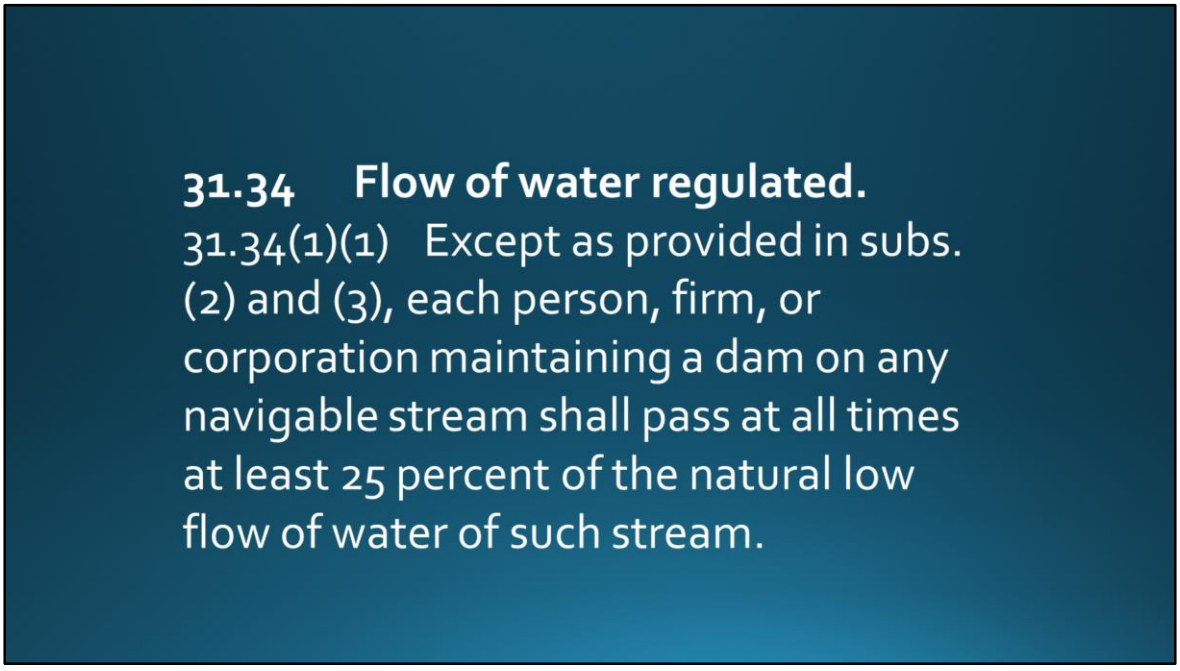
SECTION 2. The said parties shall also be empowered and authorized to improve said river.

SECTION 3. This act shall take effect and be in force from and after its passage and publication.

Approved March 19, 1878.

No authorized normal, minimum, or maximum water level.

Original permit for the Round lake logging dam.



WDNR chapter 31 – addresses providing minimum flow at all dams.

SFFR – Log Drives

- Log Drives caused significant damage to the river channel and river banks.
- Rivers were cleared of obstructions.
- Resulting in wider, shallower channels devoid of habitat complexity.
- Forest has been working for over 20 years on mitigating the damage.

To fully understand what has occurred in the area the impacts of historic logging need to be discussed. This entire conversation starts because of the logging dam at the outlet. The logging dam was built to facilitate movement of timber down to the mills. Log drives had significant and long lasting impacts on majority of our rivers and specifically the SFFR.

Stabilize Eroding Streambanks South Fork Flambeau River

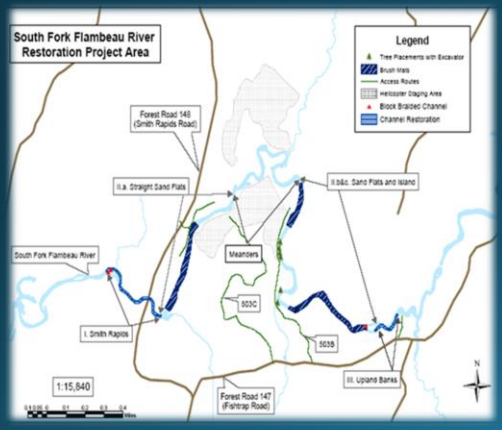
- 1991 inventory found 8 eroding "rollaway sites" from logging era.
- Contributed ~ 150 tons of sediment/year or ~50% of the annual input to that river segment.
- Between 1991-1994 banks successfully stabilized using a combination of vegetation and rounded rock along the toe of the slope.

For over 20 years the Forest has made it a priority to being the process of restoring habitat and channel conditions in the SFFR. This started in 1991 when an inventory found 8 eroding banks tied to the logging era.

These are the eight eroding bank sites that were stabilized between 1991-1994. Several of the sites were tied to areas that were once used as log rollaways during the log drives. Lengths of the eroding banks varied.

South Fork Flambeau River
Reduce width/Increase depth/Stabilize eroding banks

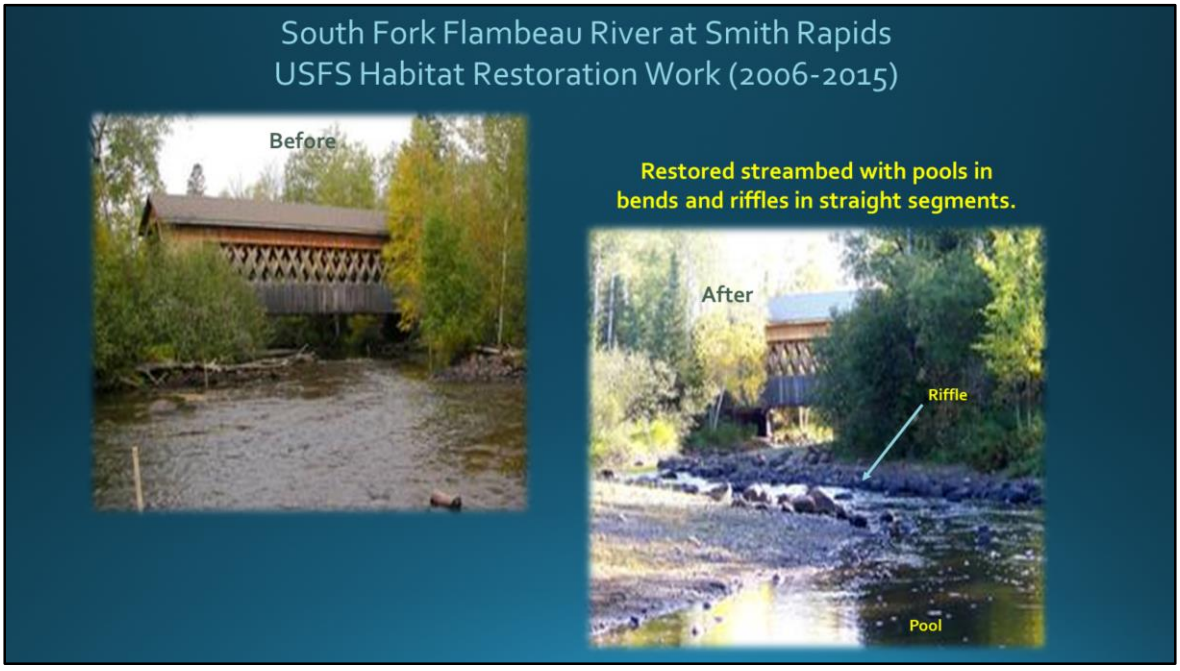
South Fork Flambeau River
USFS Habitat Restoration Work (2006-2015)



- Eroded sand and silt
- Transported downstream
- Deposited in slow pools
- Decreased channel depth
- Increased channel width

Restoration work continued starting in 2006. Heavy equipment was brought in to restore width/depth ratios and add habitat. This map shows the areas worked. Note: the helicopter work was not completed.

South Fork Flambeau River downstream from Fishtrap Road
USFS Habitat Restoration Work (2006-2015)

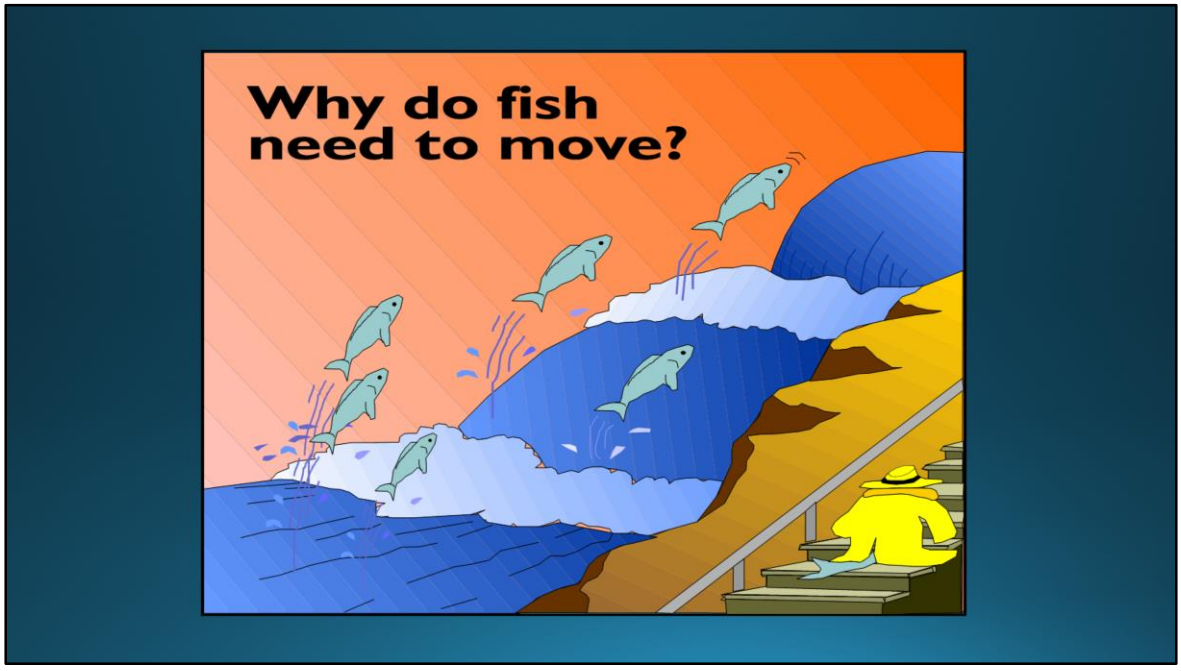


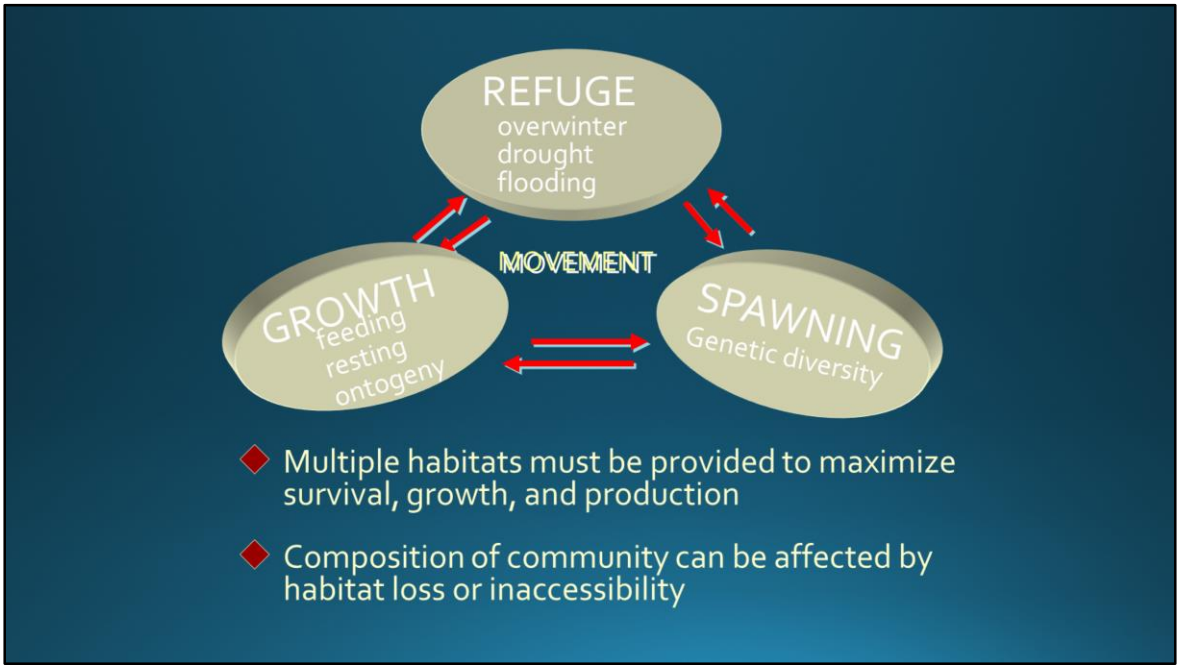
Before the stretch was wide and very shallow particularly during low flow, very little habitat for fish. Restoration work restored riffle and pool habitat. During low flows water is spread across a small area thus providing better habitat even during low flows.

Connecting the SFFR and Pike Chain – why is it important?

- Ecosystems are complex and evolve over a long periods of time.
- The Fauna within the Chain and SFFR have evolved over 12,000 years with connection and open movement between the chain and the lake.
- Movement has been disruptive over a relatively short period of time.

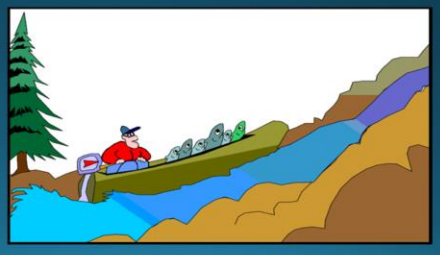
Musky in one of the raceways and lower picture shows a redhorse tail.


Why do fish
need to move?


REFUGE
overwinter
drought
flooding
MOVEMENT
GROWTH
feeding
resting
ontogeny
SPAWNING
Genetic diversity
Multiple habitats must be provided to maximize survival, growth, and production
Composition of community can be affected by habitat loss or inaccessibility

Why do river systems need fish movement?

- Fish are the major mechanism for moving energy from large downstream systems to smaller upstream systems
- Fish move and deposit high quality energy in the form of carcasses, eggs, and young-of-year fish
- Fish act as hosts to the parasitic stage of freshwater mussels. Fish distribution = mussel distribution

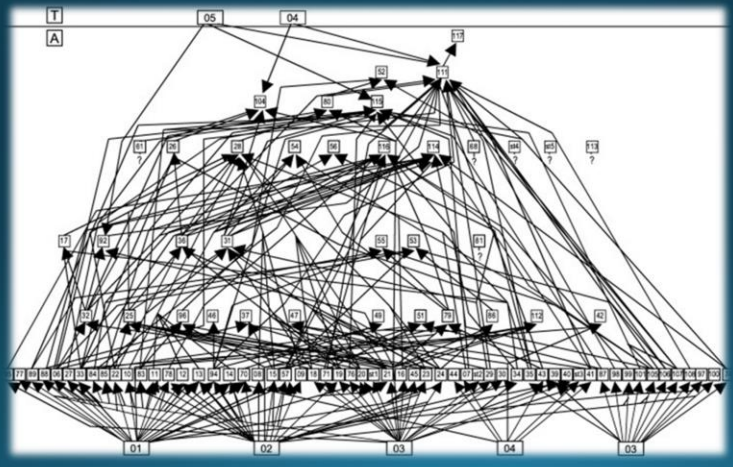


How Far?

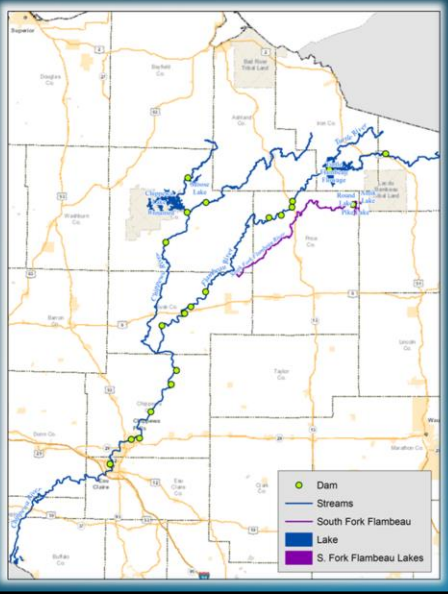
- Smallmouth bass = 70 miles
- Walleye = 75 miles
- Lake sturgeon = 100 miles

Popular angling species such as walleye and smallmouth have evolved to occupy both lake and river systems and will travel great distances between the two. Lake sturgeon is another example of a species that travels long distances to get to key spawning, summering and overwintering habitat.

Its all connected!!!



Flambeau Watershed – NNIS-movement



SFFR is freeflowing until it joins with the NF Flambeau to become the Flambeau River. There are a few rock/roller type structure on the SFFR but all allow both up/down fish passage.

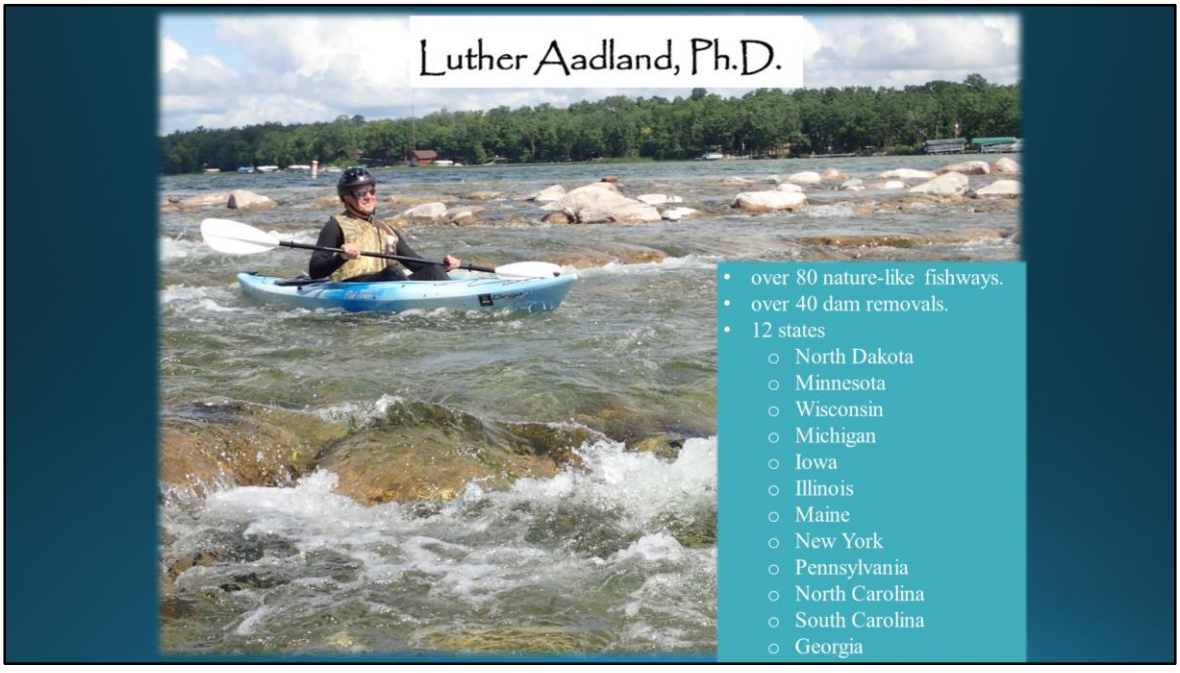
The mainstem Flambeau is heavily dammed as is the Chippewa River. Upstream fish passage is not available at the dams. As such it would be extremely difficult for NNIS fish species to invade the SFFR by **swimming** upstream. Invasion by other means is always possible and why we all need to work together to be diligent and have good NNIS prevention practices.

Weir History

- Logging dam built between 1878-1886.
- Late 1920's Otto Doering placed a log/rock weir upstream of dam. Logging dam no longer controlling lake levels.
- 1968 U.S. Forest Service purchased property, including dam and weir.
- 1971 sheet pile installed because log/rock weir was failing.
- Fish passage addressed in 1971. Rock ramp was placed, but it did not function as anticipated.

The weir today, severely limits upstream movement of fish. Fish can travel downstream but cannot get back up.

Much of the fish passage technology was developed out west for salmonid species. Salmonids are renowned jumpers. It is much more challenging to pass species like walleye and lake sturgeon.



Based on the Lake Association letter of support and feedback received during the June 2017 presentation. The WDNR was able to get a grant to contract with Luther Aadland to develop a conceptual design to provide fish passage at the outlet of round lake. FS and WDNR have worked with Luther at Winter hydro. He is the premier designer for low head fish passageways in the country.

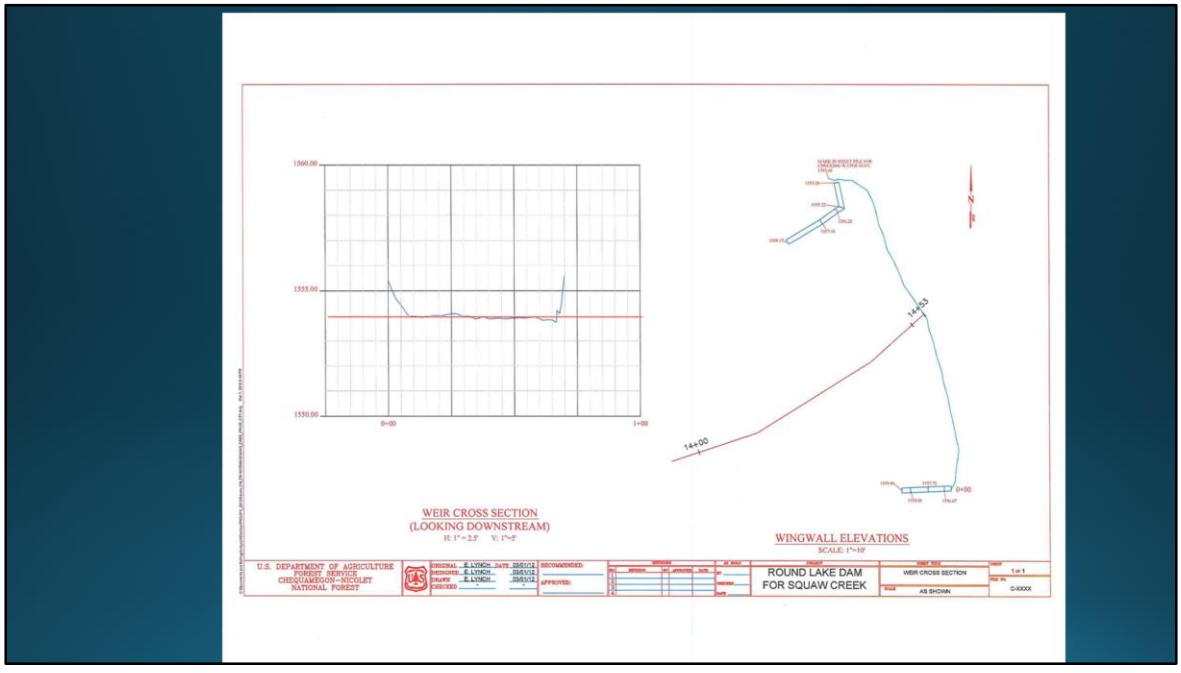
- The round lake logging dam is on the National Historic Register.
- Dam and viewshed need to be protected.
- Consulation with Heritage staff and SHPO prior to contract with Luther.
- Luther presented 2 alternatives, one involved placing rock in the raceways which is not allowed.

SHPO = State Historic Preservation Office

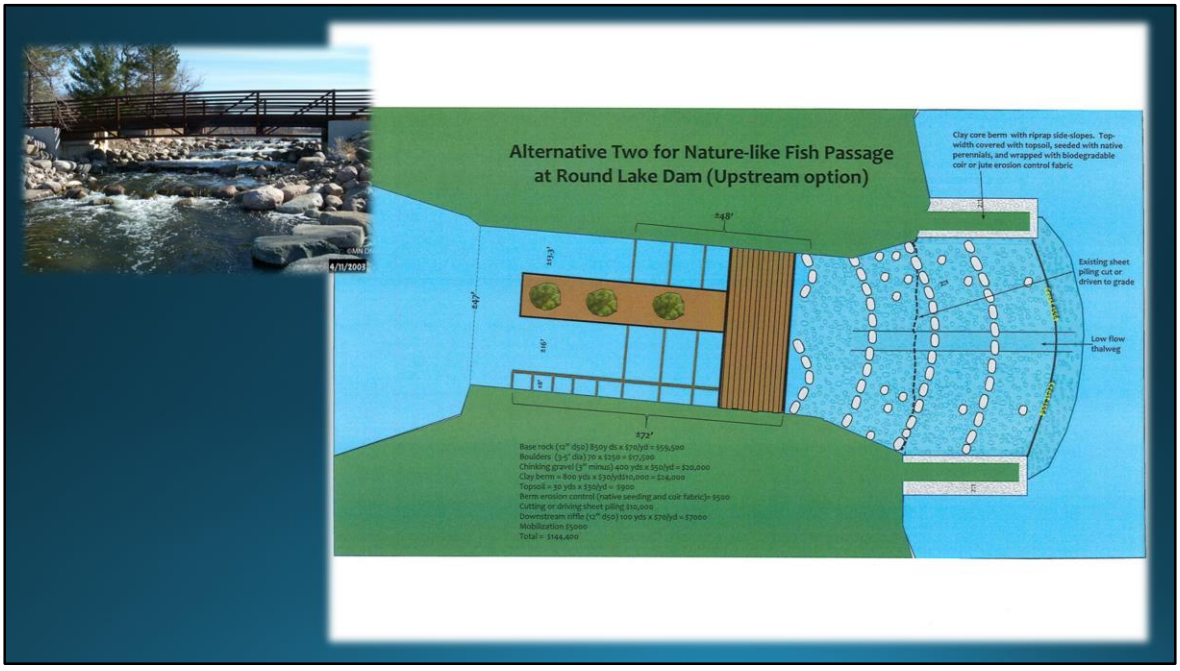
Examples of fish passageways designed by luther. Round lake proposal would be similar, like a series of steps in an amphitheater.

Existing Weir

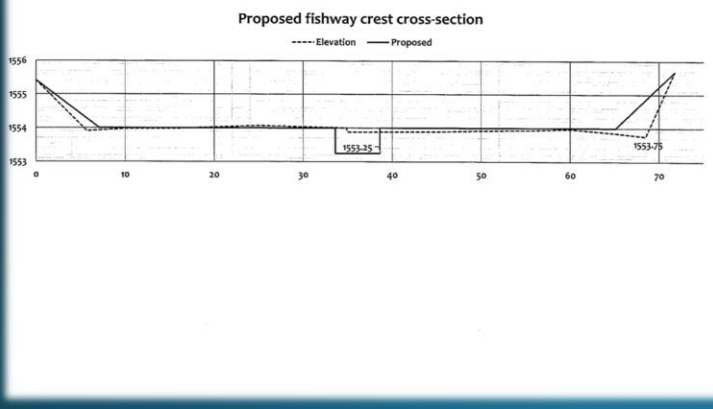
- The weir crest is 4.38 feet higher than the downstream riffle.
- Studies indicate for passage effectiveness a slope of no more than 3% is needed.
- Application of this slope would yield total fishway length of about 125 feet. There is 40ft between weir and logging dam.
- Existing weir elevation set at 1554.



A cross section of the existing sheet pile weir. Note that the set elevation of the weir is 1554 but in reality there are sections of the weir where the set elevation is below 1554 down into the 1553.xx range.

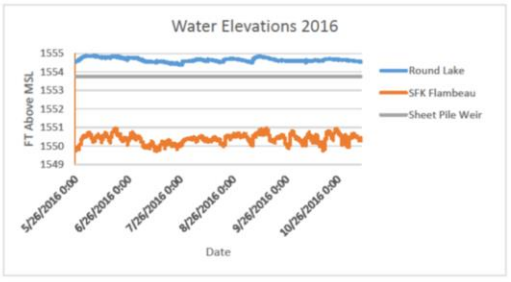


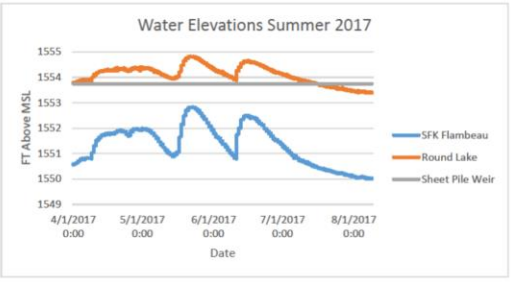
Conceptual design. 125 feet is needed, would extend (125-40) approximately 85ft into the lake. Option could be to replace clay berms with sheet pile. Length and elevation of existing sheetpile weir are maintained. Next slide discusses low flow channel.



SFFR - Instream Flow Measurements			
Date	Q_cfs	Lake elevation	river elevation
8/9/2017	26.5	1553.35	1550
5/26/2016	76.5	1554.53	1550.41
10/14/2016	99.1	1554.66	1550.55
9/15/2016	127	1554.74	1550.76
3/6/2017	146.6	1554.88	1551.23
note: 100 yr flood = 700cfs			
bankful (2 yr flood) = 350 cfs			

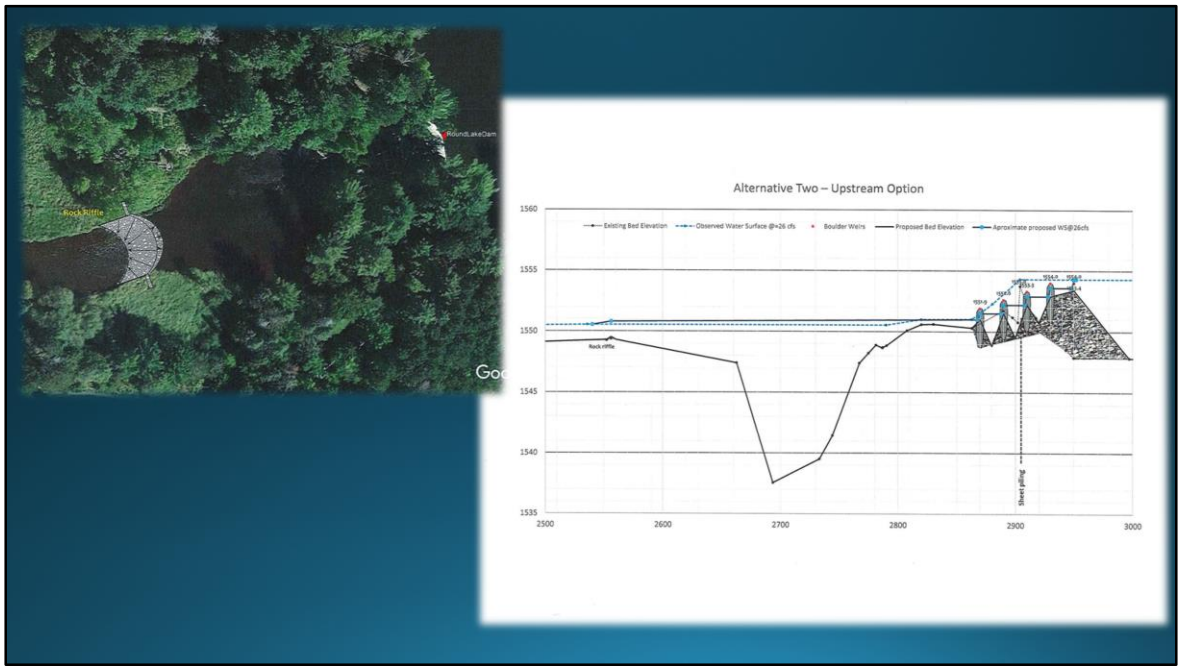
Luther did do preliminary water level modelling based on elevations taken when discharge measurements were done (2017). This graph shows the cross section of the proposed crest. The dashed line is the existing weir elevations. Solid line shows the proposed elevation with low flow channel. In this scenario the low flow channel elevation is 1553.25. Which translates to up to .5ft lower during very low to zero flow input. Low flow channel width is 5ft. Note: in august of 2017 lake level was only .1ft higher than the elevation of the low flow channel. Because of the uneven nature of the existing crest height the chain water levels have been fluctuating similarly to what would occur under this scenario.





The Forest has water level recorders in both round lake and the SFFR. Water level measurement are taken every 15 minutes. During the summer of 2017 the lake fluctuated 1.5 ft and approached the elevation of the proposed lowflow channel.

2016 was a high water year.



This diagram depicts a longitudenal profile of the conceptual design. Shows the series of constructed steps above the logging dam. The downstream rock riffle shown in the picture. The design calls for raising the water level within the dam raceways up a foot. The gravel bar on the outlet of the plunge pool will be reconfigured so that it raises the water level in the raceways up to a foot. This is being done to make it easier for fish to move through the logging dam. It also less makes it less of an elevation change that needs to be made up to match lake elevation

Pictures of the weir and logging dam area in 2008, drought period. Note weir section on the left compared to weir on the right. Section on the left is the area that is sitting below 1554 elevation.

Timeline

- Summer 2019: collect comments on conceptual design and decide if there is enough interest to move forward with developing alternatives.
- Winter 2019-2020: if yes to the above conduct more analysis including engineering and modelling. Develop alternatives
- Spring/Summer 2020: collect comments on the proposal and alternatives. Conduct public scoping, including meetings.
- Winter 2021: decision

Questions

https://www.fs.usda.gov/projects/cnnf/landmanagement/projects

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